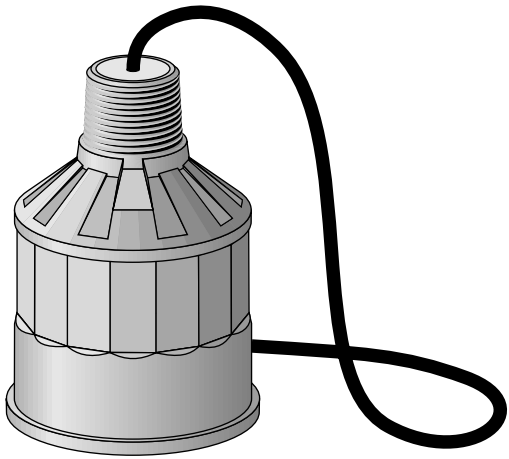
XPS/XCT Series Transducers



Instruction Manual

PL-521

December 1996

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Rev 1.1

MILLTRONICS
Technology based. Customer driven.

Thank you for purchasing Milltronics' products. We endeavour to design equipment that is simple to use and reliable in its operation, with the aim of satisfying our customers' needs.

Milltronics has been designing and manufacturing process equipment since 1954. Our fields of expertise include ultrasonic level measurement, in-line weighing of dry bulk solids and motion sensing.

Milltronics is established world wide through associate offices and representatives. Our network is continually being refined to provide our customers with first rate sales information, engineering assistance and after sales support.

For more details on our products and service, please contact us and we will provide you with a listing of the offices or representatives nearest you.

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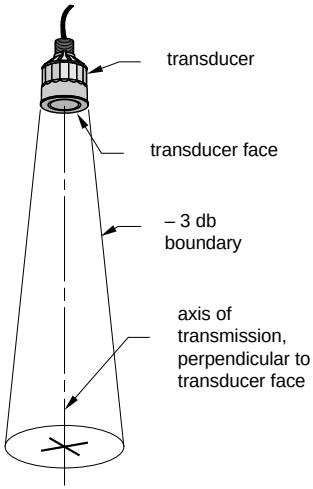
ISO 9001
Certificate #002284

ABOUT THE TRANSDUCER

The Echomax XPS / XCT series of transducers operates in association with Milltronics ultrasonic level monitoring products.

The transducer converts the electrical energy of the transmit pulse from the transceiver into acoustical energy. It then converts the acoustical energy of the echo back into electrical energy for the transceiver receive period.

The effective acoustical energy is emitted from the transducer face and radiated outward, decreasing in amplitude at a rate inversely proportional to the square of the distance. Maximum power is radiated axially (perpendicular) from the transducer face in a line referred to as the axis of transmission. Where power is reduced by half (– 3 dB), a conical boundary defining the sound beam, centered about the axis of transmission, is established. The diametric measurement of the cone in degrees defines the beam angle. Impedance matching techniques are used to optimize the transfer of power from the transducer into air and vice versa.



The XPS / XCT transducers incorporate an integral temperature sensor that reports the air temperature at the transducer to the transceiver. The connection is transparent, in that both the ultrasonic and temperature components of the transducer use the same leads.

SPECIFICATIONS

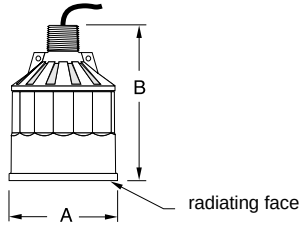
Model :	XPS - 10	XPS - 15	XPS - 30	XPS - 40	XCT - 8	XCT - 12
Measurement Range, m (ft) :	0.3 - 10 (1 - 33)	0.3 - 15 (1 - 50)	0.6 - 30 (2 - 100)	0.9 - 40 (3 - 130)	0.45 - 8 (1.5 - 26)	0.45 - 12 (1.5 - 40)
Frequency (kHz) :	43	43	30	22	43	43
Beam Angle :	12°	6°	6°	6°	12°	6°
Environmental :						
- location :	indoor / outdoor					
- altitude :	2000 m maximum					
- ambient temp :	– 40 to 95 ℃ (– 40 to 203 ℉)				– 40 to 145 ℃ (– 40 to 293 ℉)	
- pollution degree :	4					
Construction :						
- exposure :	Kynar®					
- mounting :	1" NPT or BSP conduit connection		1-1/2 " NPT or BSP conduit connection		1" NPT or BSP conduit connection	
- options :	» factory bonded flange to suit ANSI, DIN and JIS standards » polypropylene foam facing for dusty or steamy environments » submergence shield, where flooding can occur » split flange for field mounting to suit ANSI, DIN and JIS standards					
- cable :	2 wire shielded / twisted, 0.5 mm^2 (20 AWG) PVC jacket				silicone jacket	
Supply Source :	transducer shall only be supplied by Milltronics certified controllers					
Weight *, kg (lb) :	0.8 (1.7)	1.3 (2.8)	4.3 (9.5)	8 (18)	0.8 (1.7)	1.3 (2.8)
Separation :	365 m (1200 ft) from transducer					
Approvals :	CE ▼, CSA, FM, SIRA/CENELAC see nameplate or consult Milltronics for current approvals					

* approximate shipping weight of transducer with standard cable length

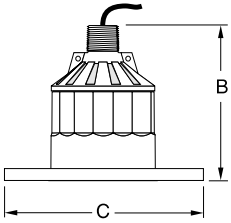
▼EMC performance available upon request

Kynar® is registered trade mark of ELF Atochem

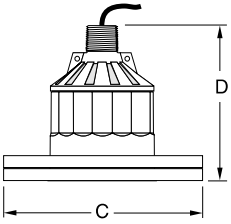
OUTLINE AND DIMENSIONS



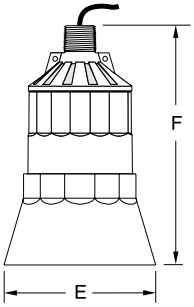
standard



optional bonded flange
refer to associated instructions



optional split flange
refer to associated instructions



optional submergence shield
refer to associated instructions

	Model					
Dimension	XPS - 10	XPS - 15	XPS - 30	XPS - 40	XCT - 8	XCT - 12
A	86 mm (3.4")	119 mm (4.7")	173 mm (6.8")	206 mm (8.1")	86 mm (3.4")	119 mm (4.7")
B	122 mm (4.8")	132 mm (5.2")	198 mm (7.8")	229 mm (9.0")	122 mm (4.8")	132 mm (5.2")
C	to suit ANSI, DIN and JIS standards					
D*	128 mm (5.0")	138 mm (5.4")	204 mm (8.0")	235 mm (9.2")	128 mm (5.0")	138 mm (5.4")
E	124 mm (4.9")	158 mm (6.2")	n / a	n / a	n / a	n / a
F	152 mm (6.0")	198 mm (7.8")	n / a	n / a	n / a	n / a

* nominal

MOUNTING

DO'S AND DON'TS

Mount the transducer so that it is *above the maximum material level by at least the blanking value*. Refer to the associated transceiver manual.

On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface.

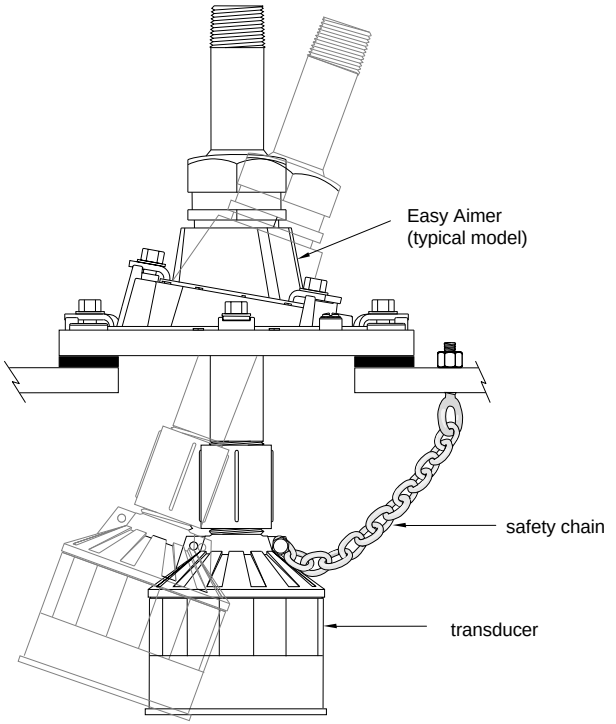
On solids applications, a Milltronics Easy Aimer should be used to facilitate aiming of the transducer.

Do not overtighten mounting. Hand tightening of the mounting hardware is sufficient.

Secure installation by connecting a safety chain from the transducer to a structural member.

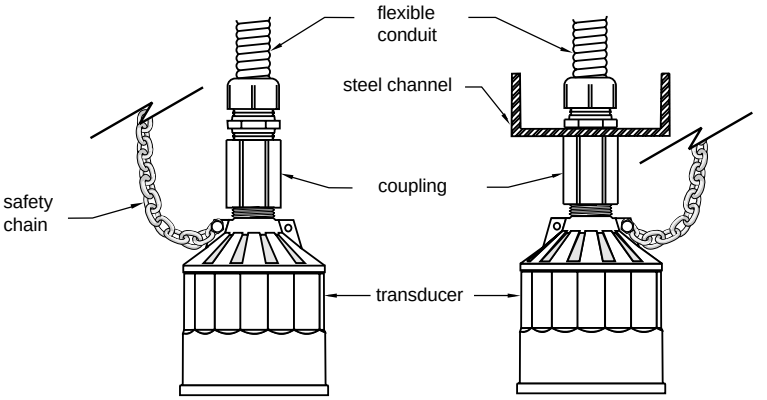
Consider the optional *temperature sensor* when mounting the transducer.

MOUNTING - SOLIDS APPLICATIONS



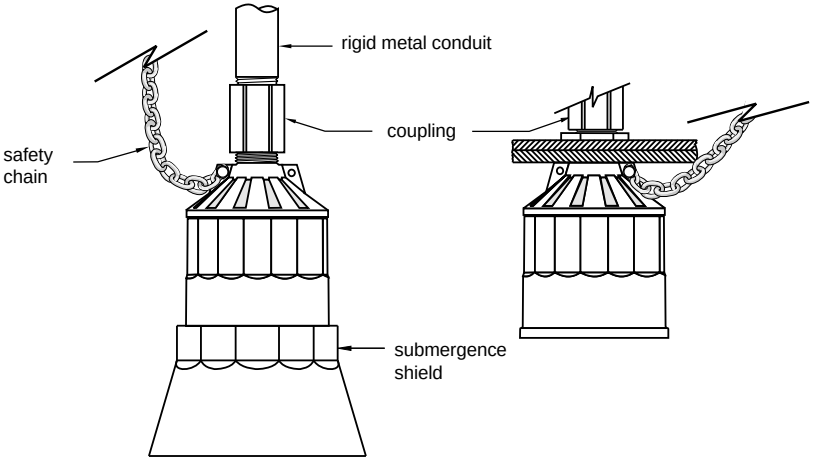
MOUNTING - LIQUID APPLICATIONS

Flexible Conduit **Bracket**



Flexible conduit mounted transducer should not be subjected to wind, vibration or jarring.

Submersible **Plywood**

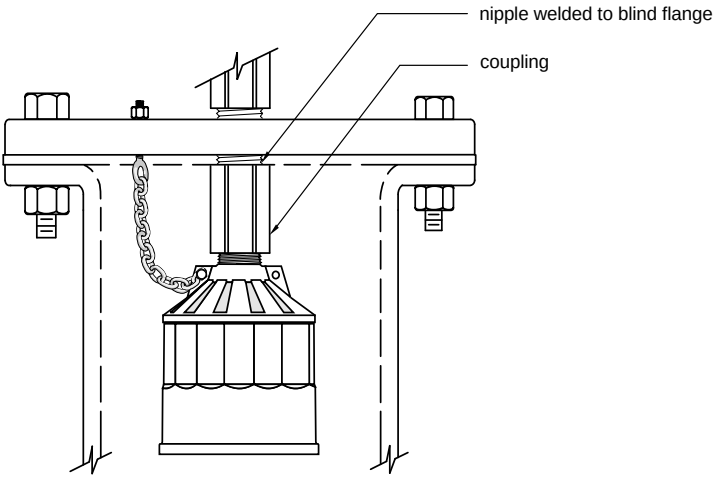


Submersible transducer, used in applications where flooding is possible.

Plywood mounting provides excellent isolation, but must be rigid enough to avoid flexing if subjected to loading.

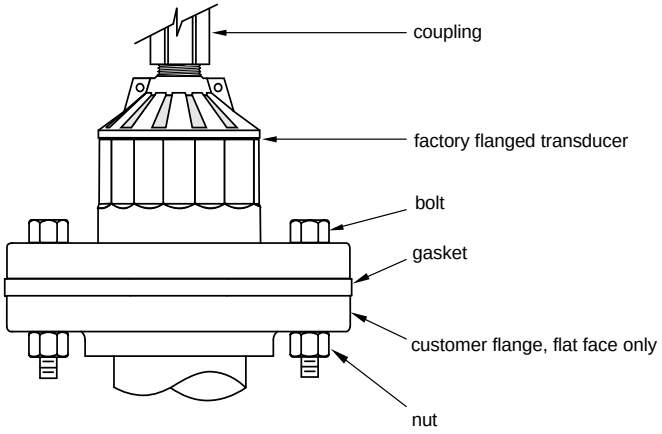
MOUNTING - LIQUID APPLICATIONS (cont'd)

Blind Flange



Flange, gasket and hardware supplied by customer.
Refer to Liquid \ Applications - Standpipes.

Flanged

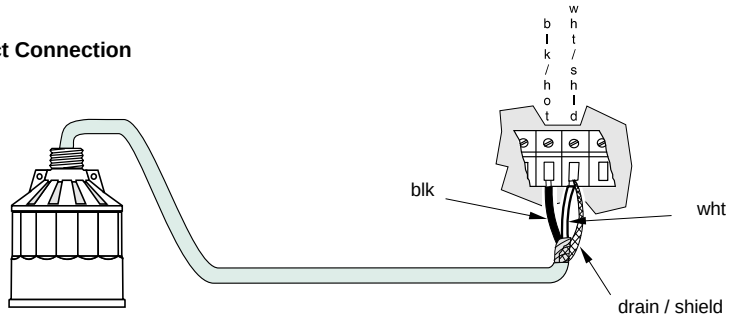


Customer flanged standpipe. If a metal flange must be welded
to pipe, refer to Liquid \ Applications - Standpipes.

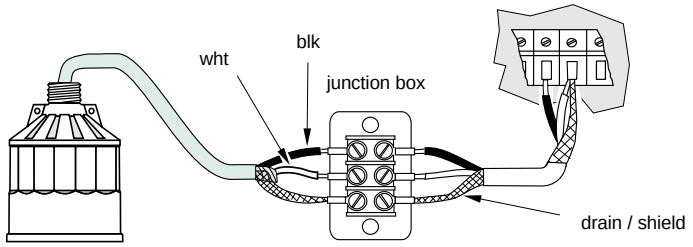
INTERCONNECTION

Milltronics transceiver (typical)

Direct Connection

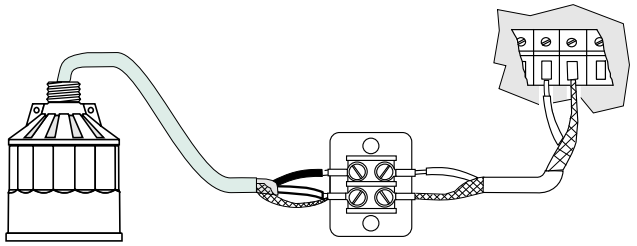


2 Wire Extension



extend cable using 18 AWG shielded / twisted pair

Coaxial Extension



extend cable using RG - 62 A/U coax for optimum noise immunity

DO'S AND DON'TS

Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

Do not route cable openly.

For optimum isolation against electrical noise, run cable separately in a grounded metal conduit.

Seal all thread connections to prevent ingress of moisture.

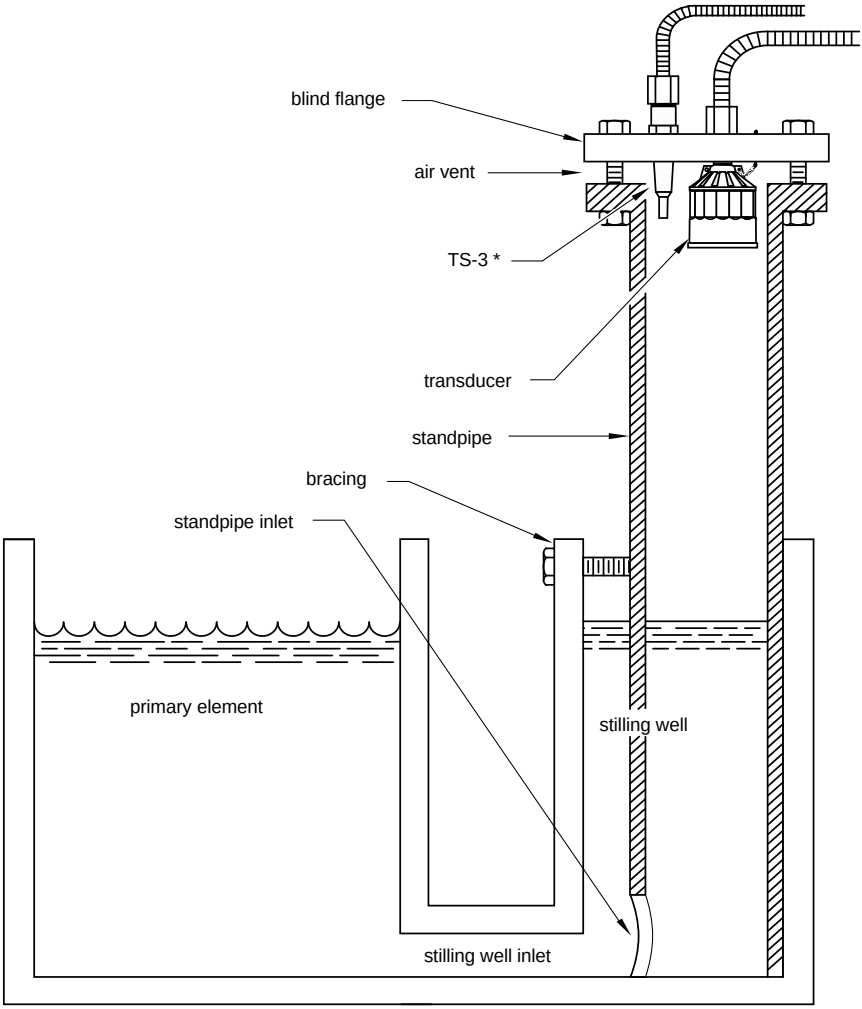
Do not run cable near high voltage or current runs, contactors and SCR control drives.

APPLICATIONS

The transducer is to be used only in the manner outlined in this instruction manual.

The transducer requires no cleaning or maintenance.

LIQUID APPLICATIONS - STILLING WELL / OCM



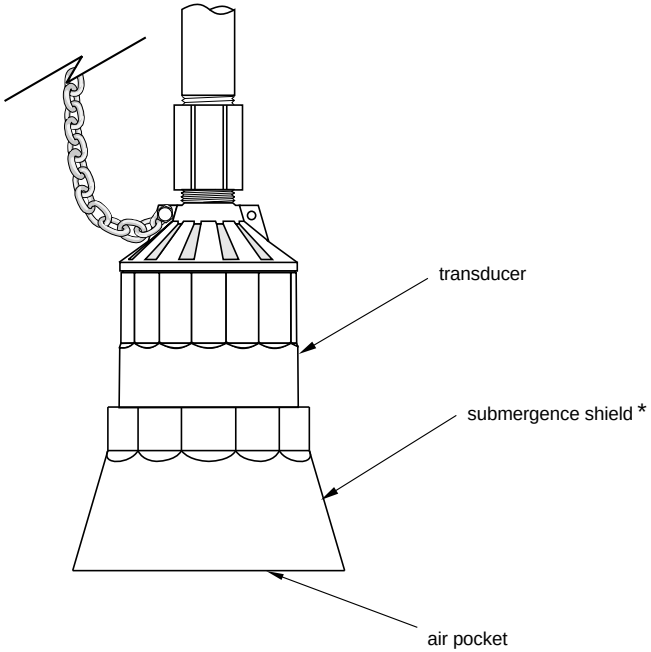
Refer to Liquid \ Applications - Standpipes.

* the use of a TS-3 temperature sensor provides better temperature tracking in applications where the temperature can change quickly.

LIQUID APPLICATIONS - SUBMERGENCE

In applications where flooding is possible the transducer▼ can be fitted with a submergence shield. The shield acts as a bell to create an air pocket in front of the transducer face. The associated transceiver▼ interprets this as a flooding condition, and reacts accordingly.

Refer to transceiver manual for programming requirements.



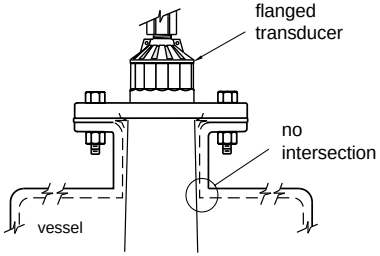
* refer to associated instruction manual for assembly details.

▼ on applicable models.

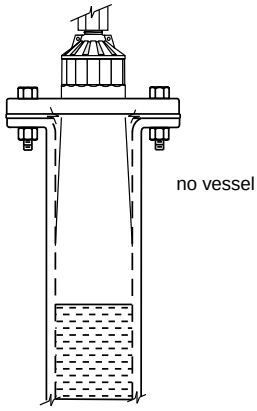
LIQUID APPLICATIONS - STANDPIPES

In many applications access must be made via a standpipe. In such cases, Milltronics can provide factory bonded flanged transducers or split flange kit that will readily mate to the flanged standpipe. Another option is to hang the transducer from a blind flange.

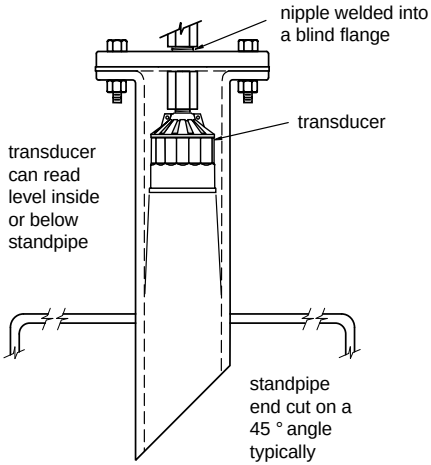
The standpipe length should be as short and the diameter as large as possible. As a rule of thumb, the -3 dB cone of the sound beam should not intersect the standpipe wall in applications opening into a vessel or larger area. Otherwise, additional blanking will be required to compensate for the interference zone created by the opening.



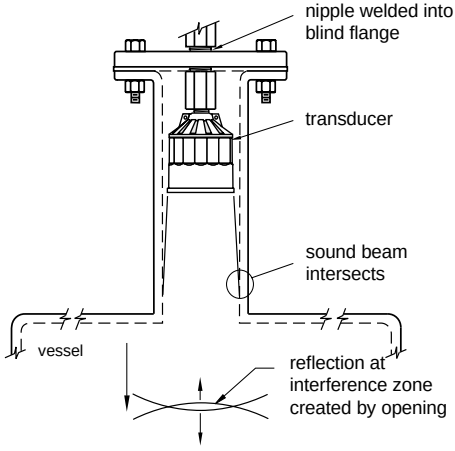
no additional blanking required



no additional blanking required

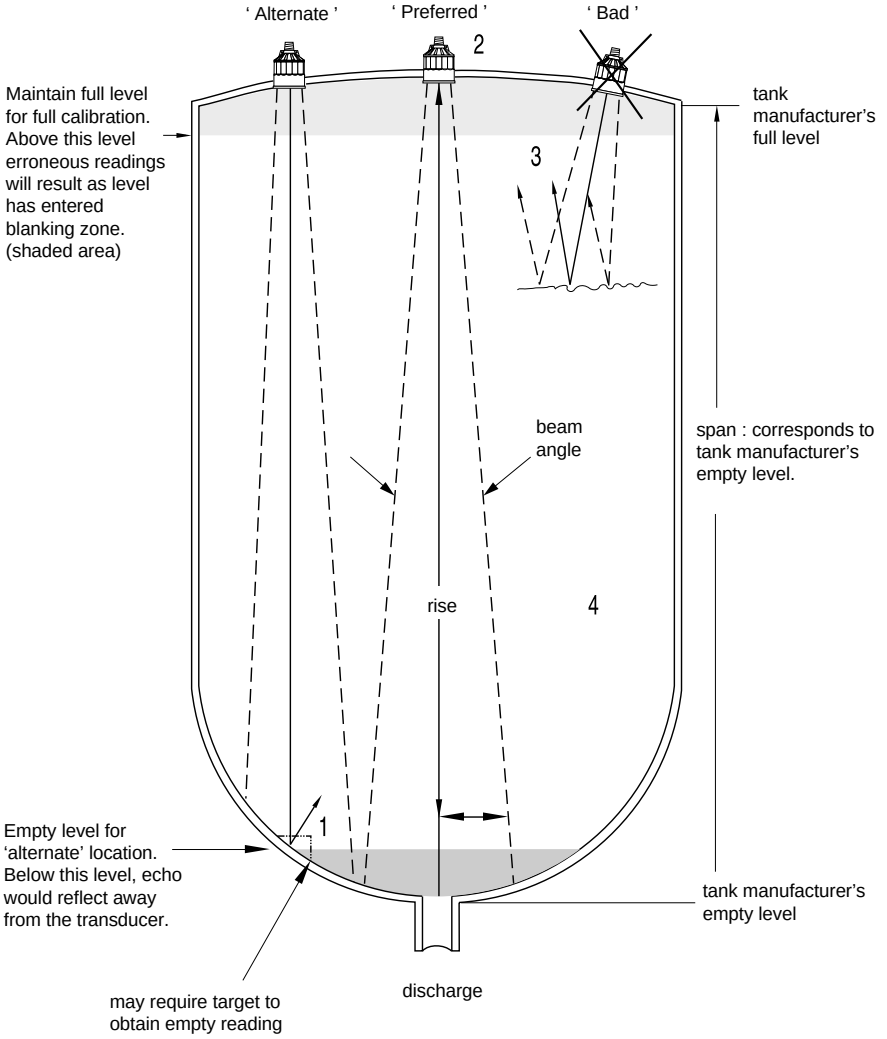


no additional blanking required



near blanking extension
of 150 mm (6") past end of
standpipe may be required.

LIQUID APPLICATIONS - VOLUME


' Alternate '
' Preferred '
' Bad '
2
3
Maintain full level for full calibration. Above this level erroneous readings will result as level has entered blanking zone. (shaded area)
tank manufacturer's full level
beam angle
span : corresponds to tank manufacturer's empty level.
rise
4
1
Empty level for 'alternate' location. Below this level, echo would reflect away from the transducer.
tank manufacturer's empty level
may require target to obtain empty reading
discharge

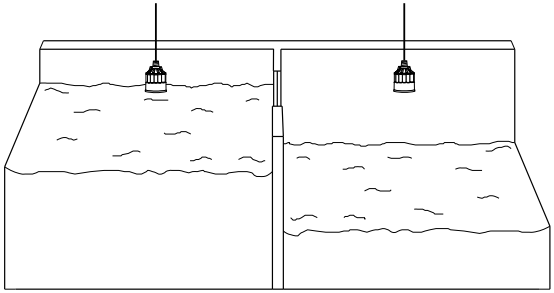
1. Beam should not detect bin bottom. If this occurs use range extension parameters (on transceivers where available) to omit false echoes. A 6° beam angle represents a rise : run of about 20 : 1 (10 : 1 for 12°). In most tanks, the transducer should be centered as much as possible (without interference from inlet) for optimum reading range.

2. Sound beam must be perpendicular to liquid surface.
   If standpipe is used, refer to Liquid / Applications - Standpipes.

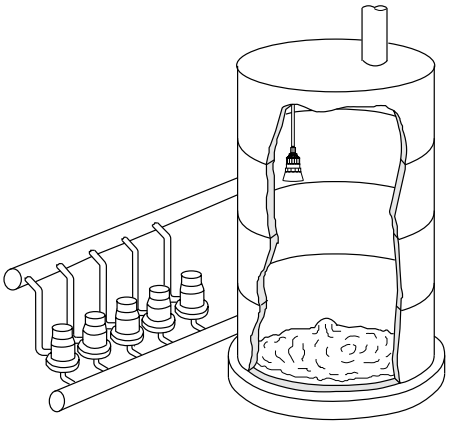
3. Echo has missed improperly leveled transducer.

4. When performing an empty or full calibration, the tank must contain its normal vapour and be at its normal temperature.

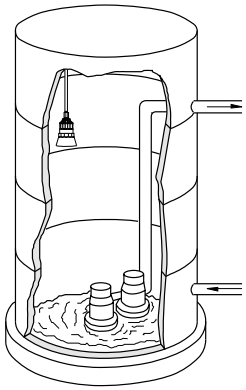
LIQUID APPLICATIONS - WATER / WASTEWATER



DIFFERENTIAL LEVEL

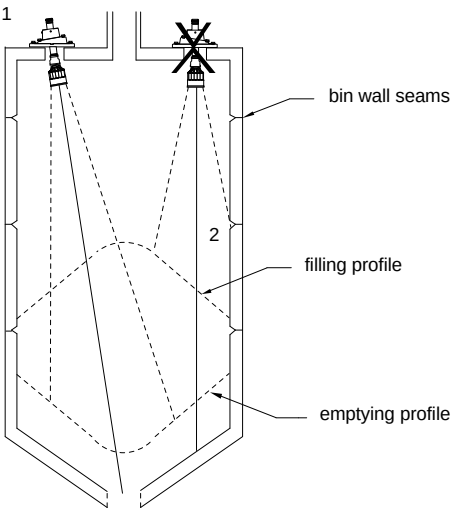


PUMP CONTROL



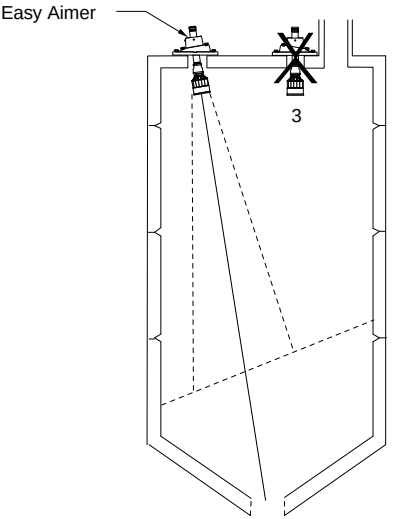
SEWAGE LIFT

SOLIDS APPLICATIONS - TYPICAL

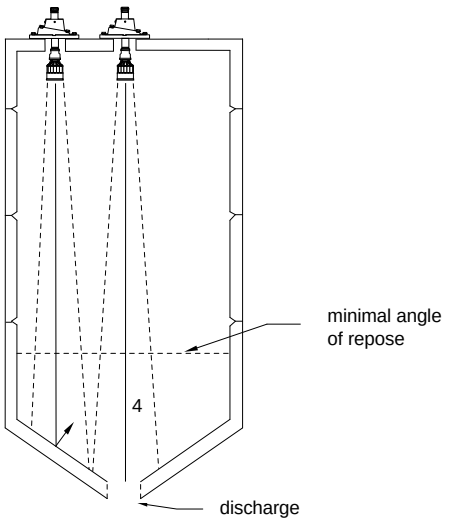


1. Transducer angled to avoid seams in bin wall and aimed at discharge in order to read bin when empty.

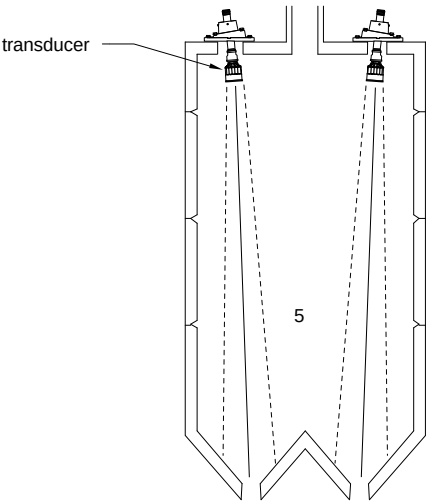
2. Avoid intersecting bin wall seams, structural members and wall irregularities. Otherwise,



3. Transducer too close to material inlet. Falling material will intersect sound beam and cause erroneous readings or loss of echo.



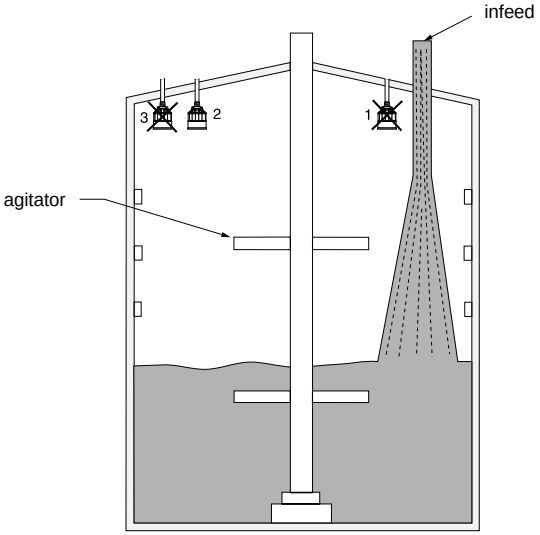
4. On fluid like solids, aim transducer perpendicular to material surface.



5. On dual discharge bins, aim each transducer at the discharge point.

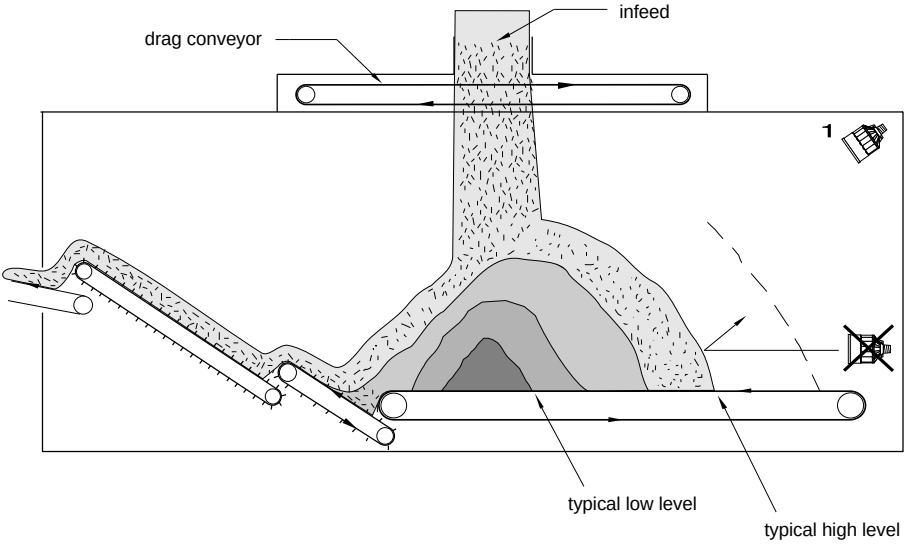
SOLIDS APPLICATIONS - SPECIAL

STORAGE BIN WITH AGITATOR



1. Transducer should be kept away from infeed.
2. Where agitators are in use, use the Agitator Discrimination parameter on transceivers where available.
3. Transducer should be aimed away from wall projections.

DRYER - WOOD CHIPS



1. Transducer should be mounted perpendicular to slope of wood chips.